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31 Oct 1983

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 B8H

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(54) Pallets and palletised containers

(57) A pallet or palletised container has horizontally extending collapsible supports (18, 20) beneath its deck (16, 14) and formed of parallel side walls (24, 28, 32) hinged to the deck and to base wall (26, 34). In order to hold the supports erect, a base member extends between pairs of the supports and carries pairs of collapsible tubular inserts which can be inserted into the supports and then opened out to hold them erect. The tubular inserts are formed from planar blanks and hinged to the base member.

FIG. 14.

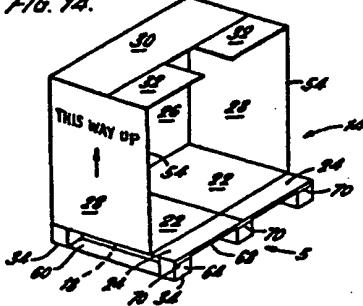
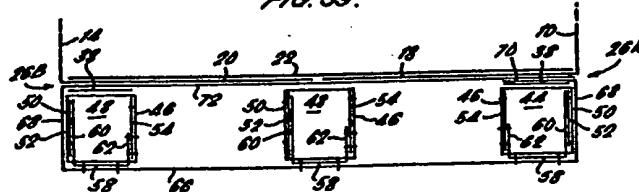


FIG. 39.



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FIG. 1.

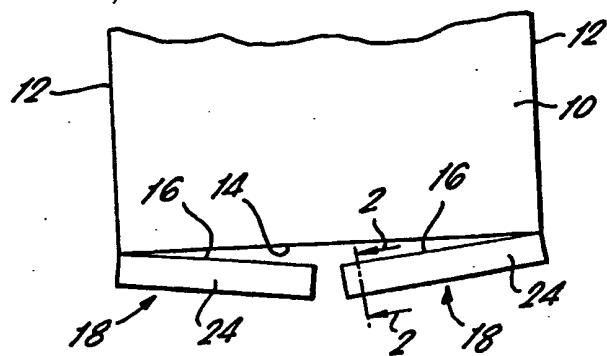


FIG. 2.

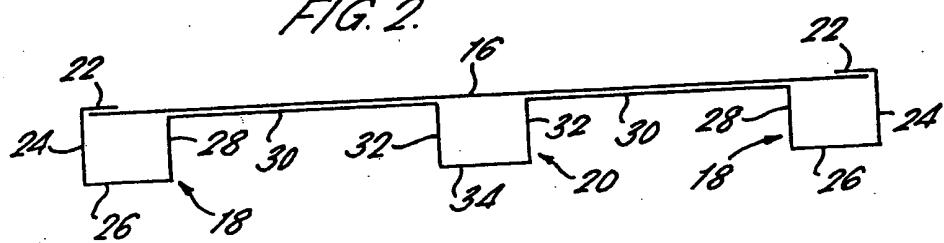
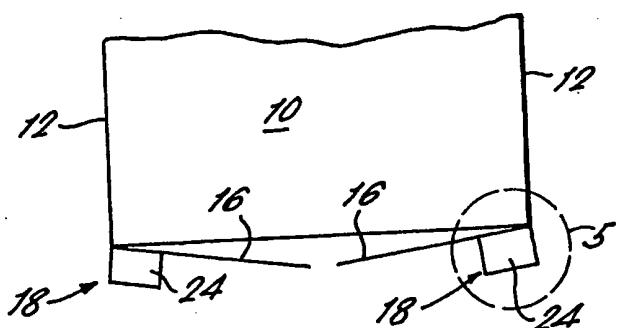


FIG. 3.



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FIG. 5.

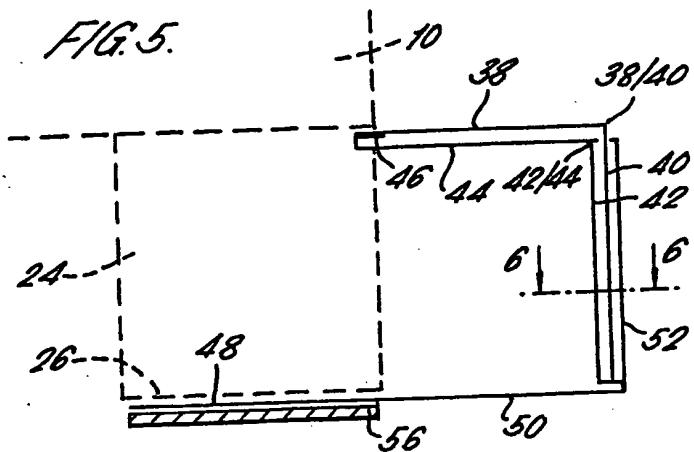


FIG. 6.

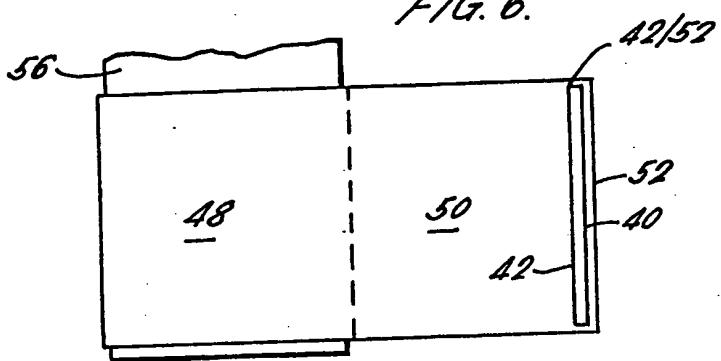
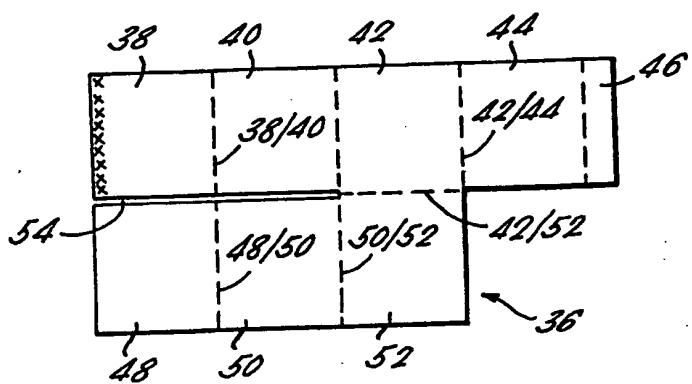


FIG. 4.



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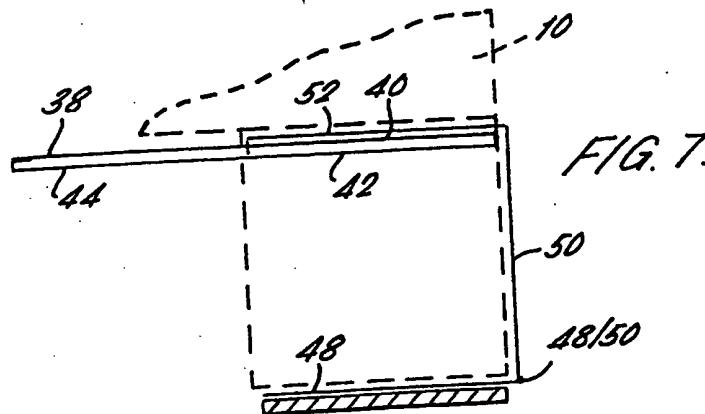


FIG. 7.

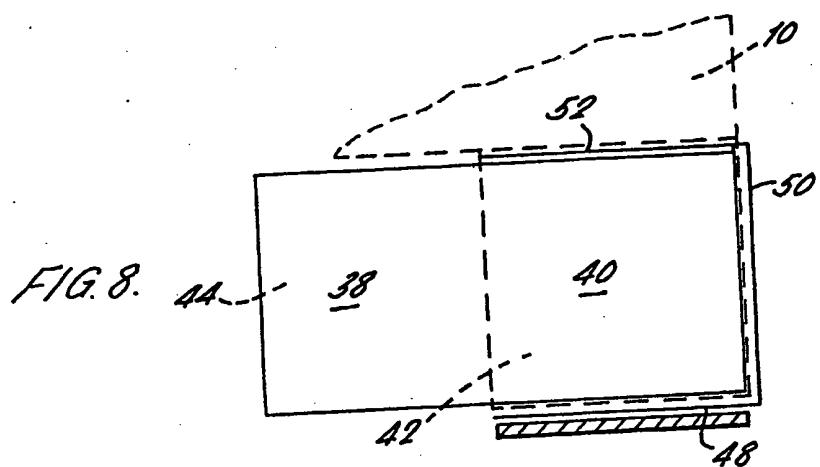


FIG. 8.

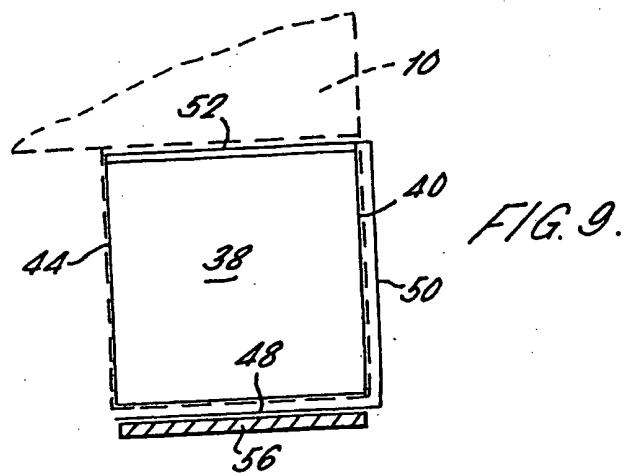


FIG. 9.

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FIG. 10.

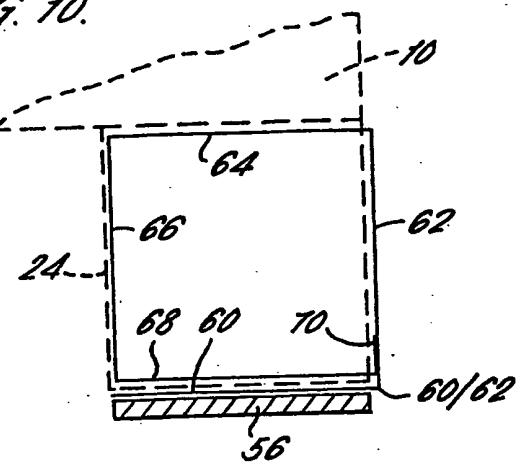
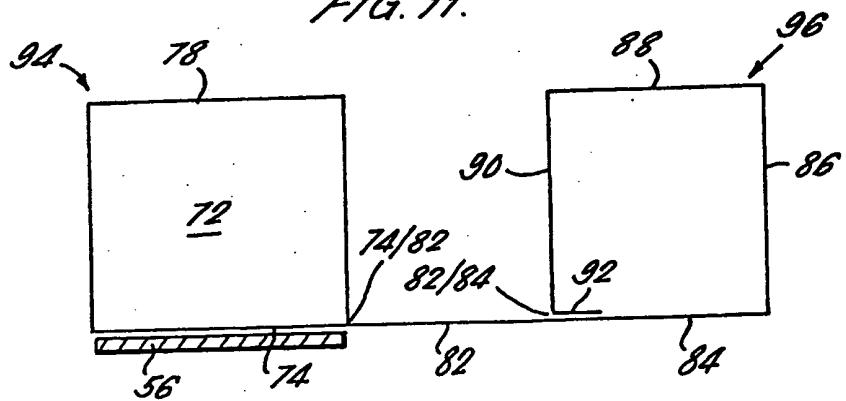


FIG. 11.



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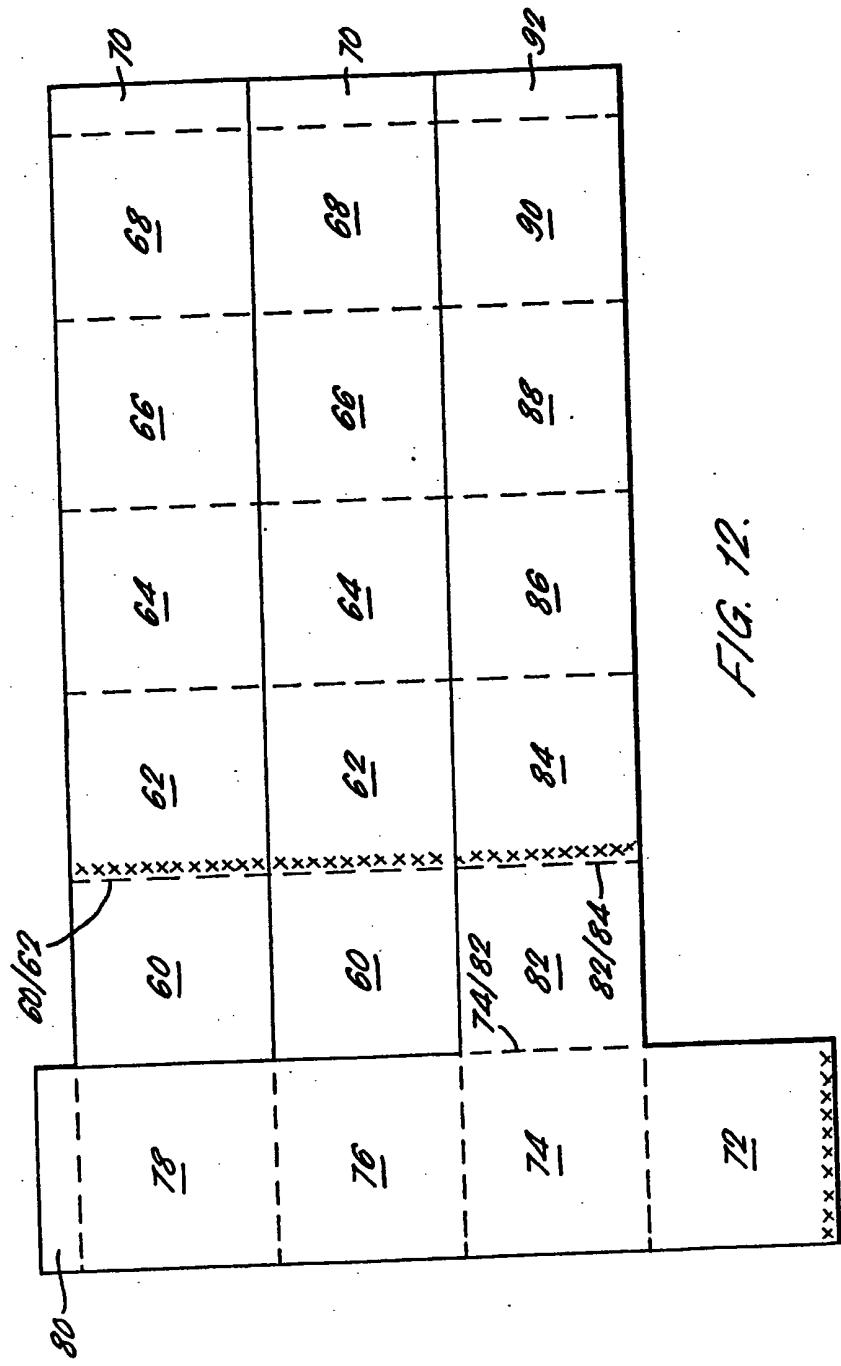


FIG. 12.

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FIG. 13.

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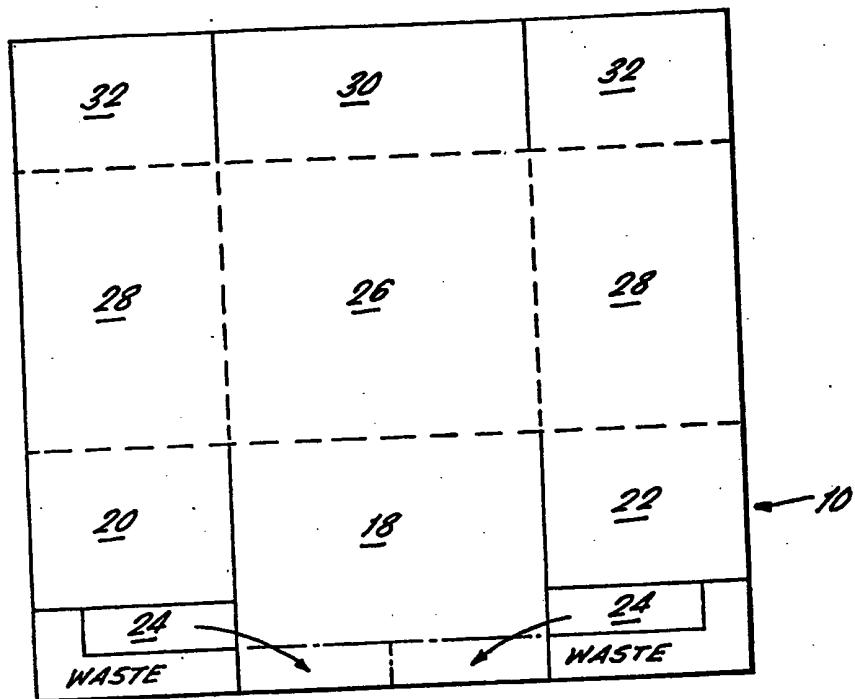
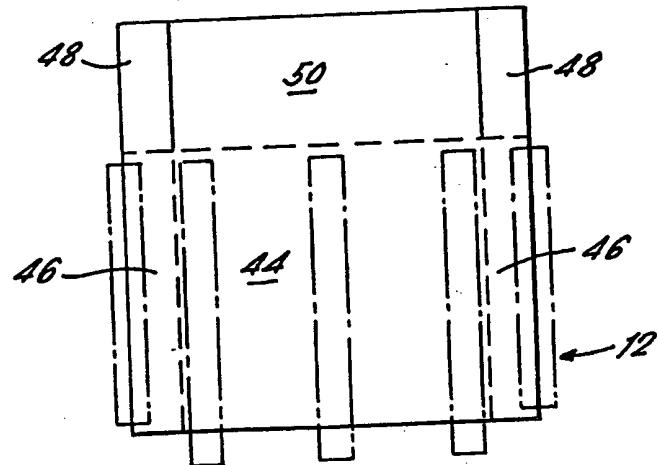


FIG. 15.



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FIG. 14.

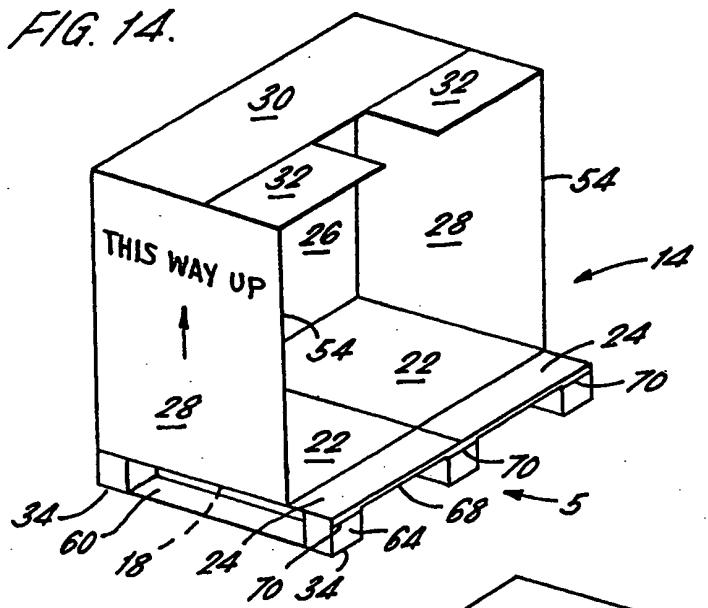


FIG. 16.

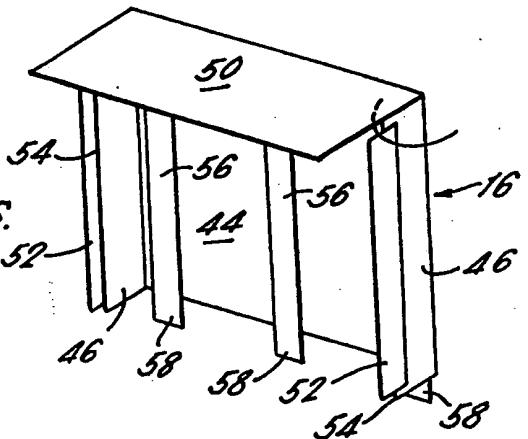
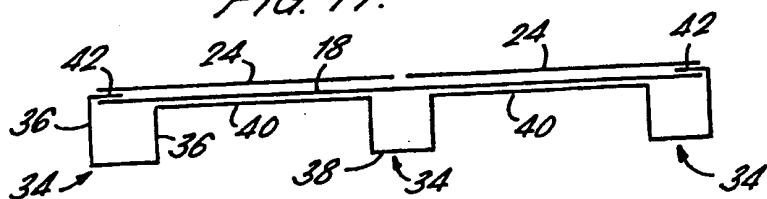


FIG. 17.



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FIG. 18.

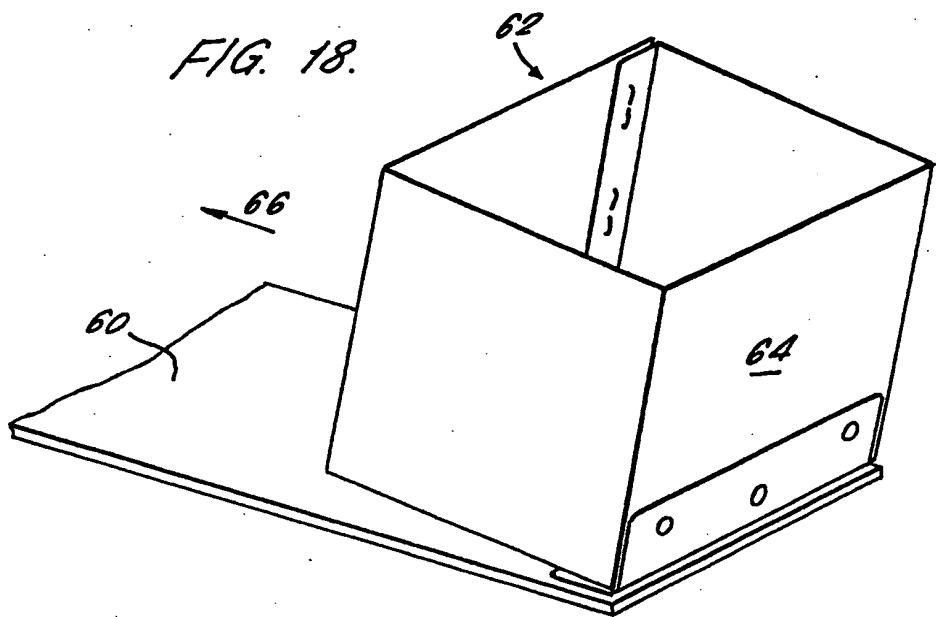
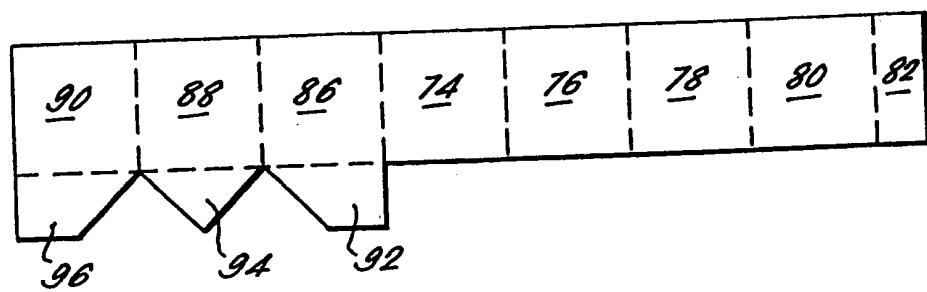


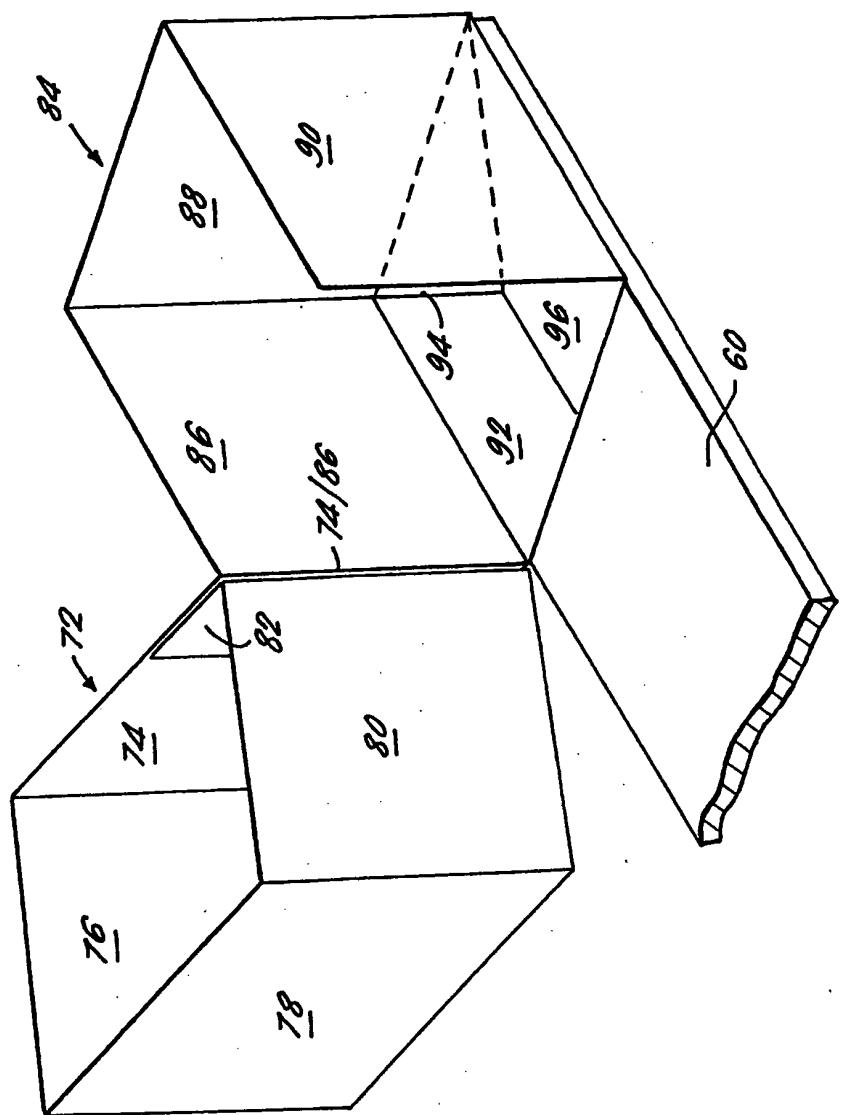
FIG. 19.



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FIG. 20.



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FIG. 21.

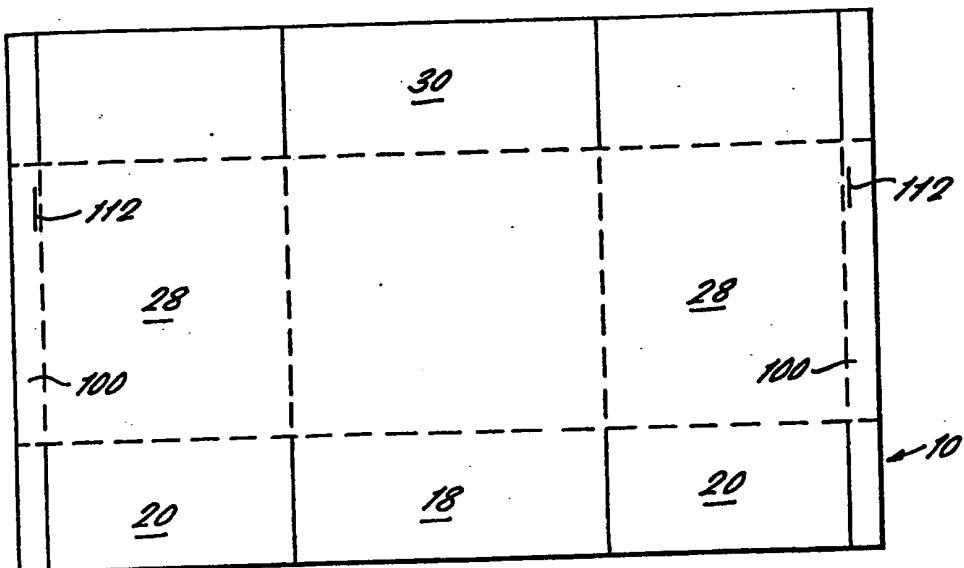


FIG. 22.

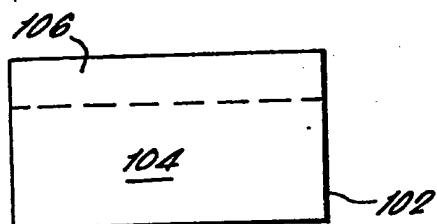
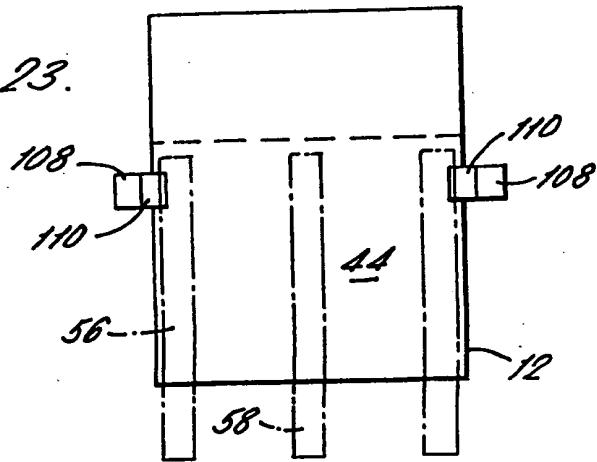


FIG. 23.



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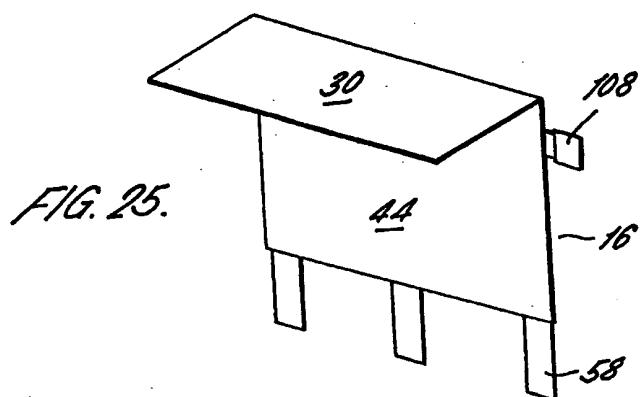
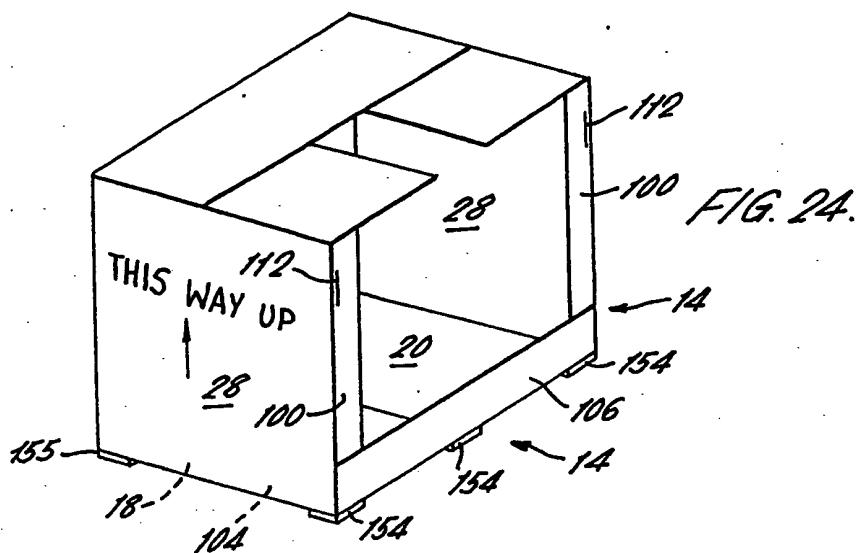
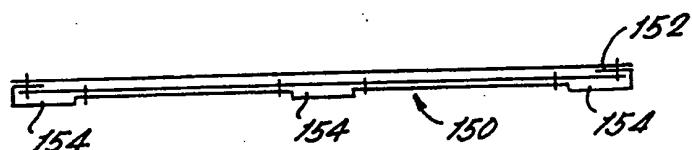


FIG. 26.



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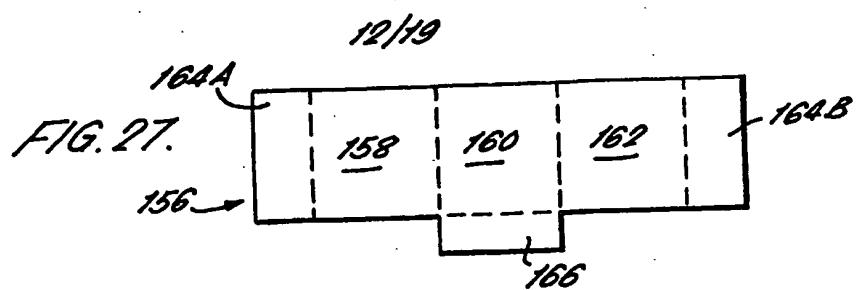
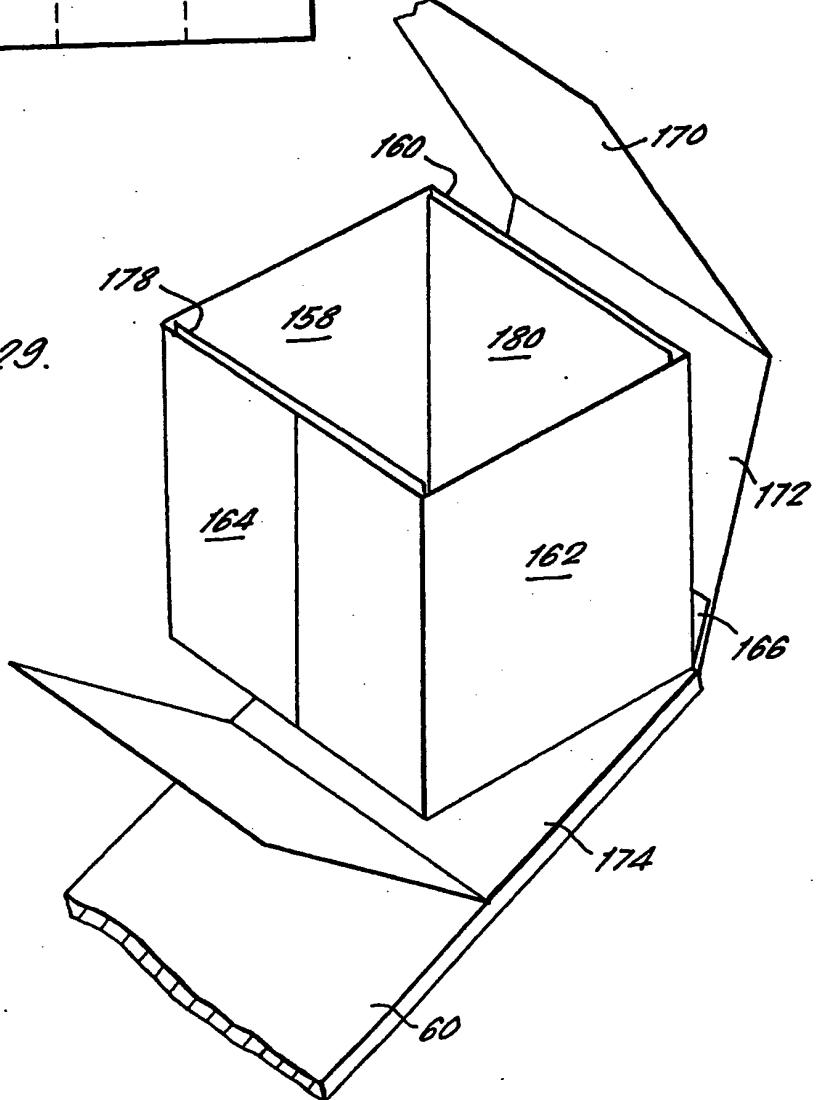


FIG. 28.

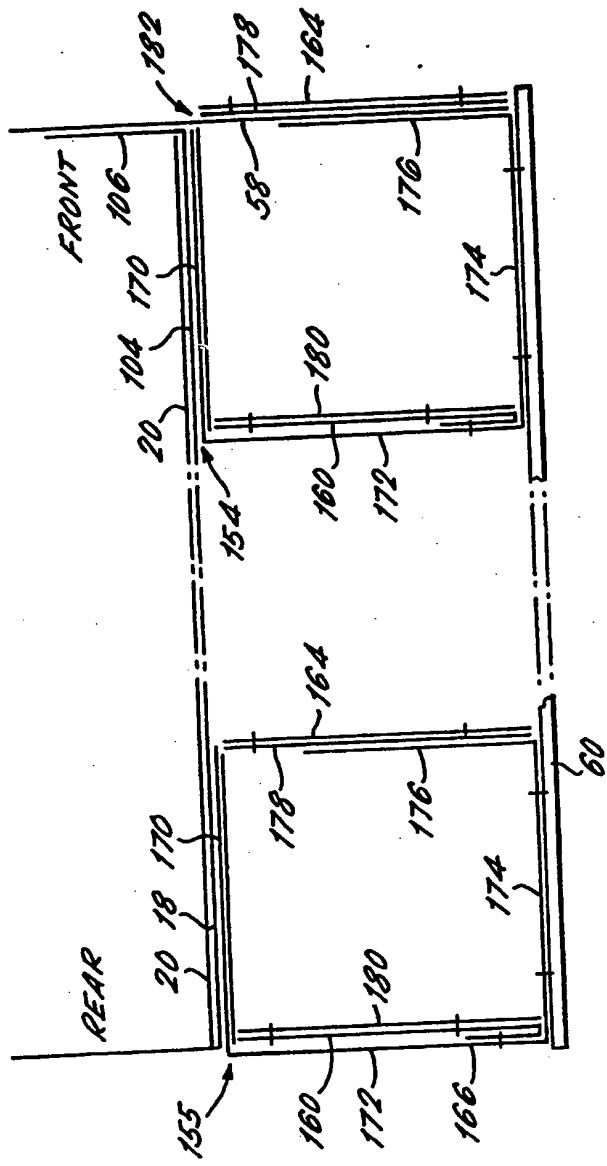


FIG. 29.



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FIG. 31.

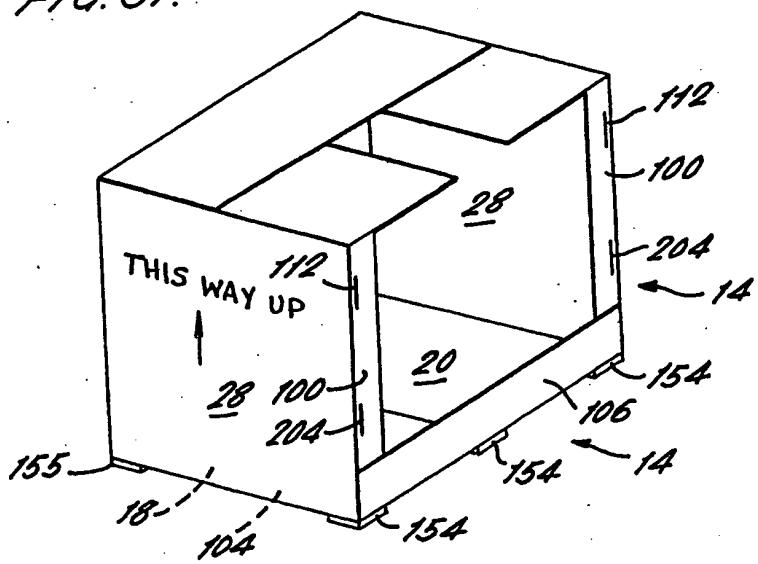
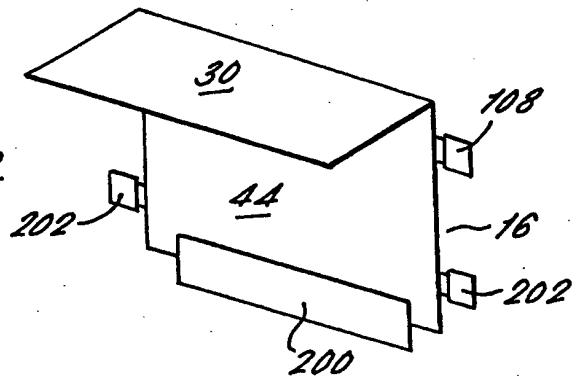


FIG. 32.



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FIG. 33.

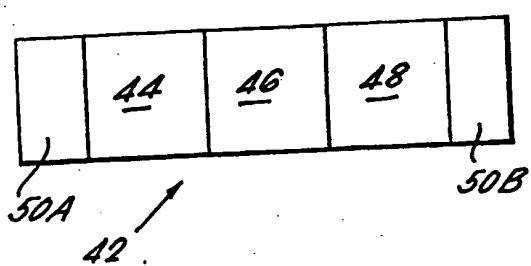


FIG. 34.

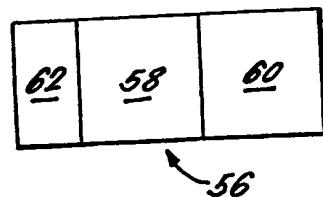


FIG. 35.

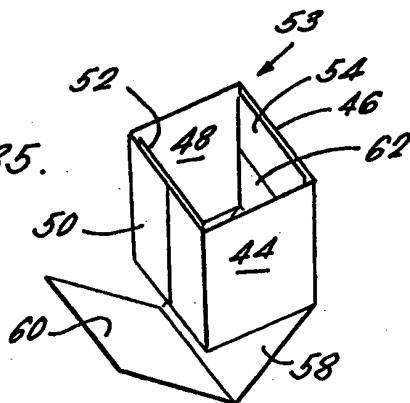
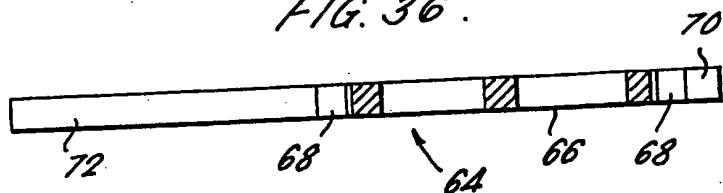


FIG. 36.



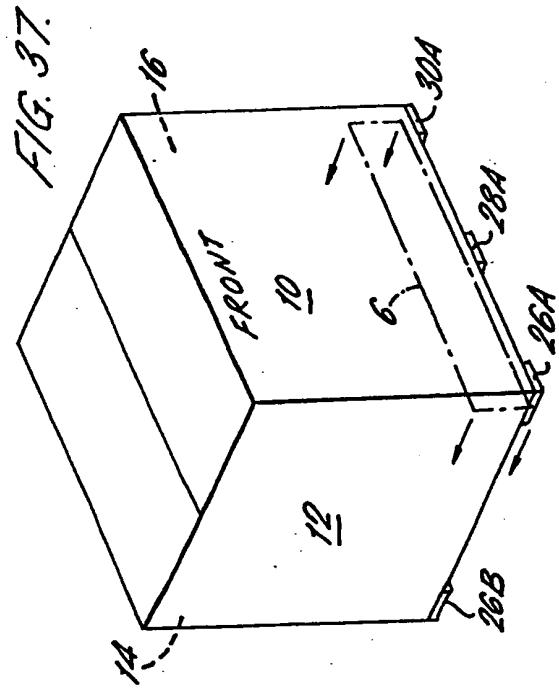
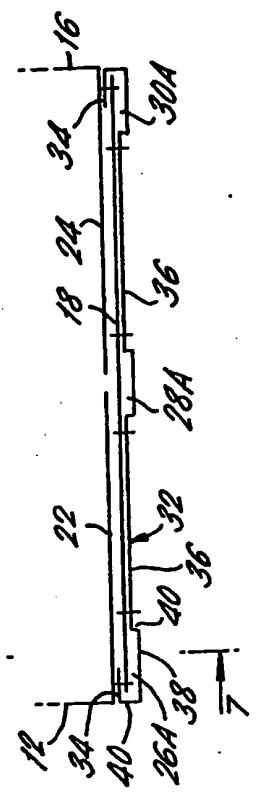
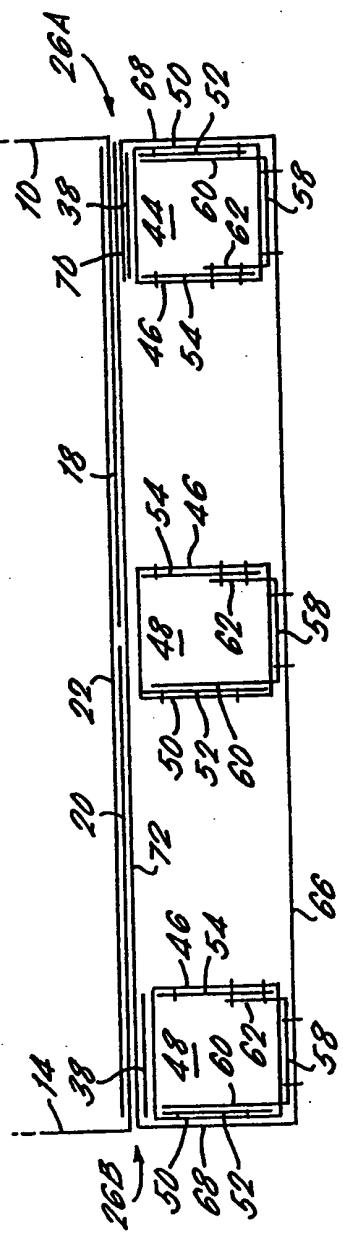


FIG. 38.



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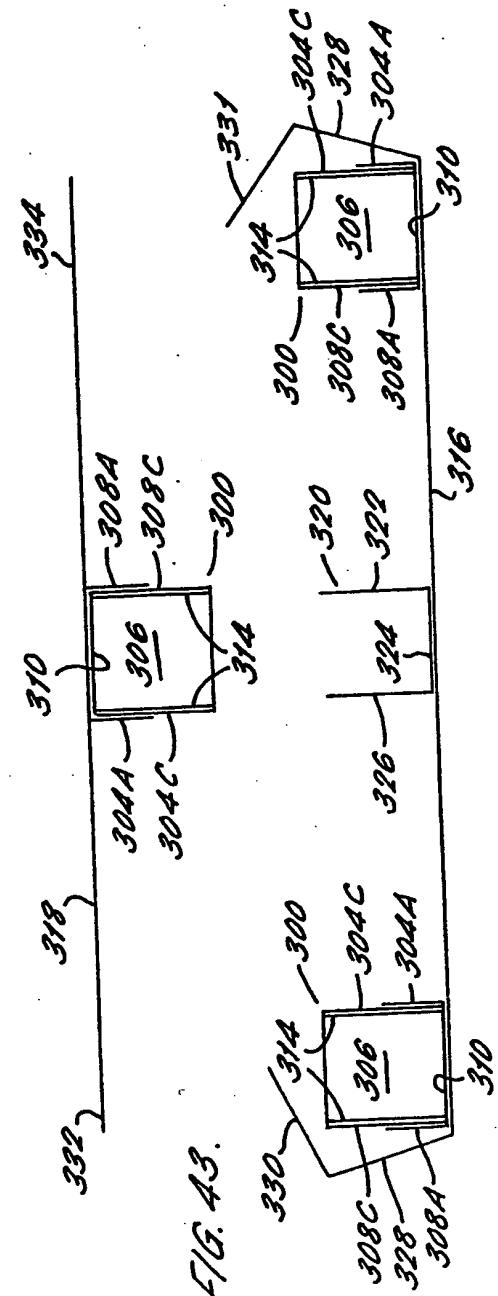
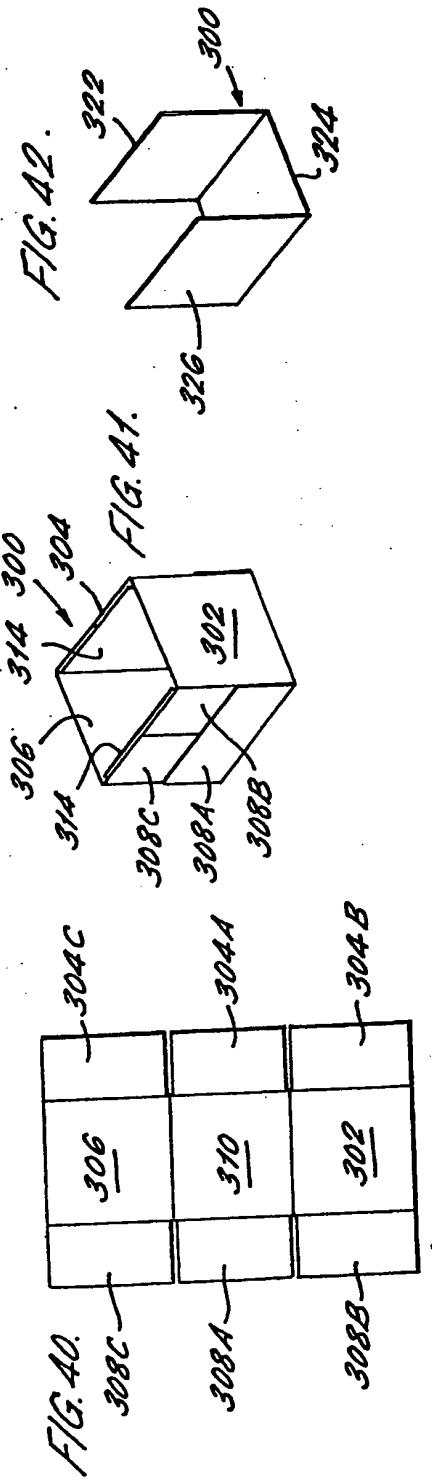
FIG. 39.



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FIG. 44.

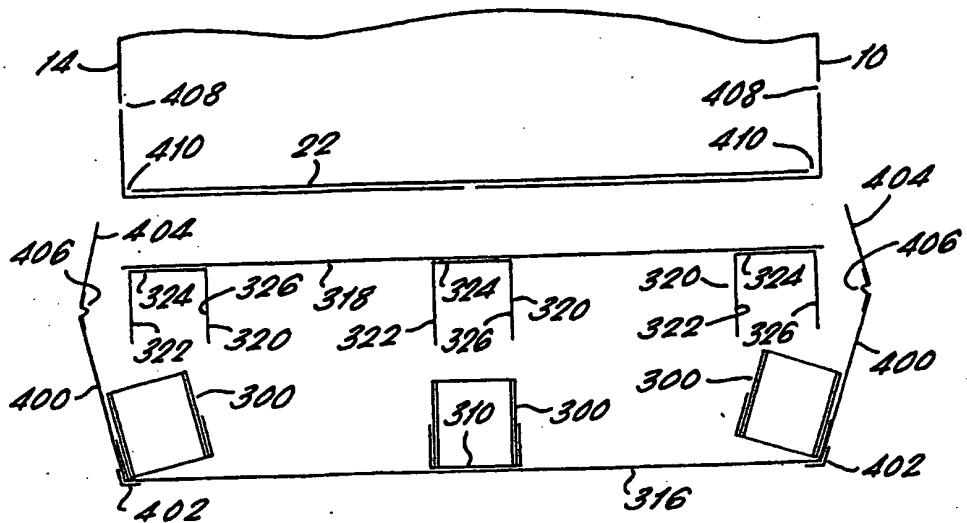
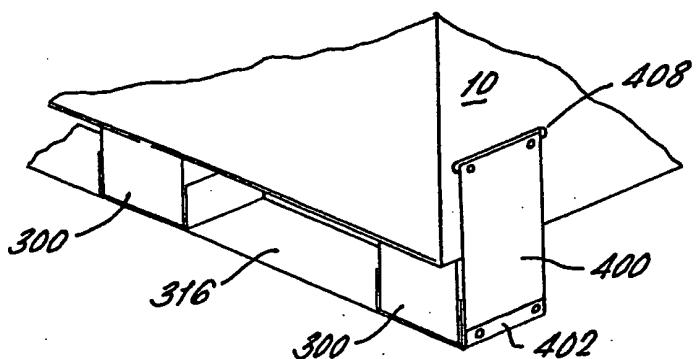


FIG. 45.



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FIG. 46.

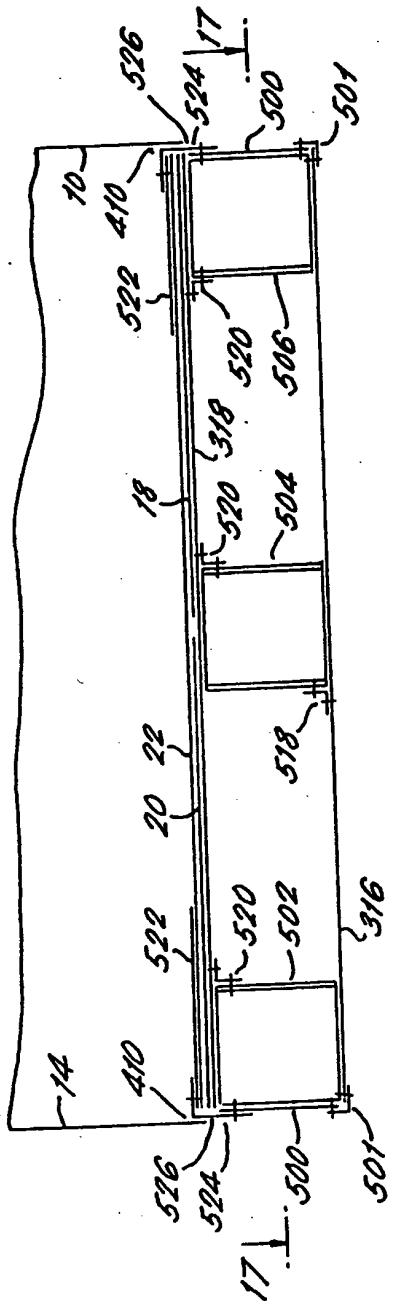
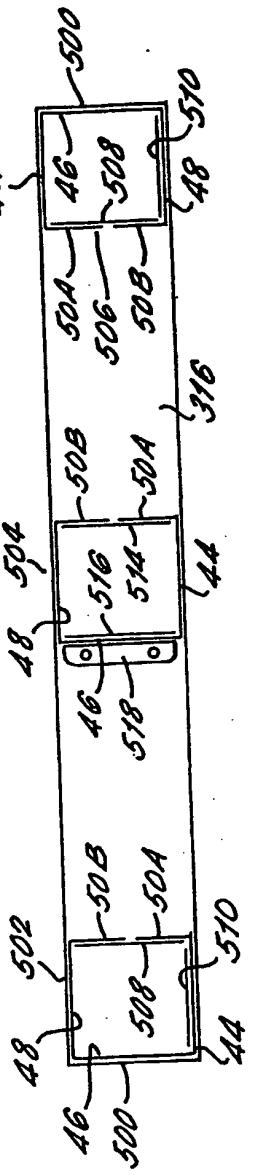


FIG. 47.



## SPECIFICATION

## Pallets and palletised containers

5 This group of inventions relates to pallets and palletised containers.

A first one of the present inventions relates particularly to pallets and palletised containers of the type hereby defined as comprising a 10 deck for supporting a load, a plurality of collapsible supports provided on the underside of the deck, each support comprising a base wall and a pair of parallel side walls each side wall having a lower edge hinged to the base 15 wall and an upper edge hinged beneath the deck, and at least one insert for each support adapted to be inserted therein to hold the support erect with the side walls upright.

In accordance with the first invention, such 20 a pallet or container further comprises at least one flat base member adapted to extend between and lie flat against the base walls of at least two of the supports, and means for attaching the inserts for those two supports to 25 the base member, each insert comprising a collapsible rectangular tube of sheet material having four walls hinged one to another, and the attachment means being arranged to permit the tube to be inserted in a collapsed 30 condition into the support and to permit the tube then to be opened out so that two walls of the tube extend across the support.

A second one of inventions relates particularly to packaging cases or boxes of corrugated board and particularly but not exclusively to such cases which are large and have an inbuilt pallet.

A known packaging case of this type has a palletised base, four upright sides and four lid 40 flaps. When being packed with small items, difficulties may be encountered because the packer may not be able to reach down inside the case to pack the lower layer or layers of items neatly.

45 In accordance with the second invention there is provided a packaging case of corrugated board adapted to have a particular right way up, wherein a side of the case is removable to permit packing of the case from the side.

In accordance with a third one of the present inventions, there is provided a pallet or palletised container, comprising a deck and at least two support assemblies for supporting 55 the deck spaced from a support surface, each support assembly comprising a base member extending widthways or lengthways beneath the deck and having a lower surface to rest on the support surface and an upper surface, at 60 least one spacer member extending between the base member and the underside of the deck to support the deck, means securing each spacer member to the base member of the deck, a tie member secured to each end 65 of the base member and extending upwardly

therefrom to the deck and means to secure each tie member to the pallet or container.

Specific embodiments of the inventions will now be described by way of examples with reference to the accompanying drawings, in which:

Figure 1 is an end view of a palletised container according to the first invention;

Figure 2 is a sectional view taken along the section line 2-2 of Figure 1;

Figure 3 is a view similar to Figure 1 of a modified container;

Figure 4 is an illustration of a blank for forming an insert for use with the containers of Figures 1 to 3;

Figure 5 is a view of the portion 5 of the container shown in Figure 3 with an insert about to be inserted;

Figure 6 is a sectional plan view taken 85 along the section line 6-6 of Figure 5;

Figures 7 to 9 correspond to Figure 5 but show different stages of insertion of the insert;

Figure 10 is similar to Figure 9 but illustrates a modified insert;

90 Figure 11 illustrates a support for use with the insert shown in Figure 10; and

Figure 12 illustrates a blank for forming two inserts as shown in Figure 10 and one support as shown in Figure 11;

95 Figure 13 shows a blank for making one part of a case according to the second invention;

Figure 14 is a perspective view of said one part of the case;

100 Figure 15 shows a blank for making the other part of the case;

Figure 16 is a perspective view of said other part of the case;

105 Figure 17 is a partial front view of said one part of the case, looking in the direction 5 indicated in Figure 14, and showing three support tubes;

Figure 18 is a perspective view of one form of insert for insertion into the support tubes;

110 Figure 19 shows a blank for a modified form of insert;

Figure 20 is a perspective view of the modified form of insert;

115 Figure 21 shows a blank for making a main part of a modified case;

Figure 22 shows a blank for making a further part of the modified case;

120 Figure 23 shows a blank for making another main part of the modified case;

Figure 24 is a perspective view of said one part of the modified case;

Figure 25 is a perspective view of the other main part of the modified case;

125 Figure 26 is a partial front view looking in the direction 14 shown in Figure 24;

Figures 27 and 28 show blanks for making a modified support;

Figure 29 is a perspective view of the support partly assembled;

130 Figure 30 is a partial side section view of

two supports fitted to the modified case; and Figures 31 and 32 correspond to Figures 24 and 25 but show a modified case; Figures 33 and 34 illustrate two blanks used to make a spacer member for use in the third invention;

Figure 35 is a perspective of the spacer member;

Figure 36 is a plan view of the remainder of each support assembly;

Figure 37 is a perspective view of a container without the support assemblies fitted;

Figure 38 is a partial front elevation of the container sectioned by the plane 6 shown in Figure 37;

Figure 39 is a partial side elevation of the container, with support assembly fitted, sectioned along the line 7-7 shown in Figure 38;

Figure 40 shows a corrugated board blank for part of a modified support assembly;

Figure 41 is a perspective view of the part made using the blank of Figure 40;

Figure 42 is a perspective view of a further part of the modified support assembly;

Figure 43 is a view similar to Figure 39 of the modified assembly but omitting the container and with the assembly exploded;

Figure 44 is a view similar to Figure 39, but exploded, showing a second modified support assembly;

Figure 45 is a partial perspective view of a corner of the arrangement shown in Figure 44;

Figure 46 is a view similar to Figure 39 showing a third modified support assembly; and

Figure 47 is a sectional view of the support assembly shown in Figure 46, the section plane being denoted by the arrows 17-17 in Figure 46.

Referring to Figure 1, a cardboard container according to the first invention has two end walls 10, and two side walls 12. In order to form the base of the container, two inner base flaps 14 are hinged to the end walls 10, and two lower base flaps 16 are hinged to the side walls 12. Referring more particularly to Figure 2, each lower base flap 16 is provided with two outer supports 18 and a centre support 20 formed by a single sheet of board. The sheet of board provides two stitching flaps 22 which are secured to the lower base flap 16, two dependent outer side walls 24 for the outer supports 18, two base walls 26 for the outer supports 18, two inner side walls 28 for the outer supports 18, a pair of panels 30 which are secured to the lower base flap 16, a pair of side walls 32 for the central support 20 and a base wall 34 for the central support 20. As shown in Figure 1, the supports 18, 20 extend across the width of the respective lower base flaps 16. In the modification shown in Figure 3, the supports 18, 20 extend across only a small portion of the width of the lower base flaps 16 from the edges thereof hinged to the side walls 12. In Figures 1 and 2, the lower base flaps 16 are shown slightly lowered from the horizontal position, where they would be secured to the inner base flaps 14.

The supports 18, 20 are collapsible so that they lie flat against the lower base flaps, in order to reduce the amount of space taken up by the container during transportation and before assembly by the user. During assembly, inserts are inserted into the supports 18, 20 to hold the supports erect. The inserts will now be described more particularly with reference to Figures 4 to 9.

The insert is formed from a board blank 36 as shown in Figure 4, in which dotted lines denote score lines and in the finished insert provide hinges between the adjacent panels. The blank comprises a row of four panels 38, 40, 42, 44 and a stitching flap 46. Beneath this row, there is a row of three panels 48, 50, 52. Panel 52 is hinged to panel 42 at hinge line 42/52, and a slit 54 separates panels 38, 48 and panels 40, 50. The stitching flap 46 is stitched to the shaded portion of panel 38, so that panels 38, 40, 42, 44 form a collapsible rectangular section tube. Panel 48 is secured flat against a strip of plywood 56 which extends along the length of side of the container and has two further inserts secured thereto in a similar way for insertion into the other supports 18, 20. During assembly, the tube is collapsed and the insert is folded 180° at hinge line 48/52.

The panel 48 is located beneath base wall 26 of the support. The insert is folded 90° at hinge line 50/52 and 90° at hinge lines 38/40 and 42/44. Thus the position is reached as shown in Figures 5 and 6. The insert is then folded 90° at hinge line 48/50 and the tubular part of the insert is flattened out to reach the position shown in Figure 7. With the tubular part still flat, the tubular part is twisted 90° about hinge line 42/52 so that the hinge lines of the tubular part are upright and the insert attains the position shown in Figure 8. The tubular part is then opened out into its rectangular configuration so that the panel 40 lies against the panel 50 at one end of the support 18 and so that the panel 44 extends across the other end of the support 18 to hold the support erect, as shown in Figure 9. A similar operation is performed on the other two inserts attached to the plywood strip 56 to hold the other two supports 18, 20 on the same lower base flap 16 erect. A further plywood strip with three inserts is then used to hold the supports 18, 20 on the other lower base flaps 16 erect.

The panels of the insert may be reinforced with plywood panels, as necessary.

In a modification of the above described embodiment, the plywood strips extend, instead, at right angles to the direction in which the plywood strips 56 extend so as to join

5 pairs of supports 18 or 20 on the two lower base flaps 16 of the container. This has the advantage that, once the inserts are in their final position, the plywood strips prevent the inserts from being slid out of the supports. In a further modification, plywood strips extend in both of these directions and are attached to one another beneath the supports.

10 A simpler form of insert will now be described with reference to Figures 10 and 12. The board blank illustrated in Figure 12 provides blanks for two such inserts and also a blank for a support which will be described later. The blank for the insert comprises a row 15 of five panels 60, 62, 64, 66, 68 and a stitching flap 70 which is stitched to the shaded portion shown on panel 62. Panels 62, 64, 66, 68 thus form a collapsible rectangular tube to which is hinged panel 60 at the 20 hinge between panels 62 and 68. Panel 60 is secured flat against a plywood strip 56, in a similar fashion to that in which panel 48 was secured to the plywood strip in the first embodiment. The panel 60 is located beneath 25 the base wall 26 of the support 18, and the tubular insert, completely or partially flattened is hinged around hinge line 60/62. As the panel 62 reaches an upright orientation, the tube opens out into a rectangular configuration 30 so that the panel 68 lies against the base wall 26 of the support 18, the panel 64 lies against the underside of the lower base flap 16 of the container, and the panel 24 extends across the inner end of the support 18. Thus 35 the support 18 is held erect.

40 The panels of the tubular insert may be reinforced with plywood panels. In particular panel 62 may be provided with a plywood panel on the outer surface thereof which is wider than the panel 62 in order to abut the ends of the side walls 24, 28 and prevent the panel 62 from being pushed into the support 18 past its upright position.

45 A further such insert is attached to the other end of the plywood strip 56 to hold the other support 18 erect. And yet a further insert may be used to hold the centre support 20 erect. However, rather than such a centre support there now follows a description of an 50 alternative centre support which does not require the support 20 shown in Figure 2.

55 The alternative centre support is formed from the remaining portion of the blank shown in Figure 12, which comprises a row 60 of panels 72, 74, 76, 78 and a stitching flap 80, and extending at right angles to that row from panel 74 a row of panels 82, 84, 86, 88, 90 and a stitching flap 92. The stitching flap 80 is attached to the shaded portion of 65 the panel 72 to form a first collapsible rectangular tube 94. The stitching flap 92 is attached to the shaded portion shown on panel 84 to form a second collapsible rectangular tube 96. The panel 74 is secured to the centre of the plywood strip 56 as shown in

70 Figure 11. In order to hold the tube 94 erect, the hinge 82/84 is folded 90° so that panel 90 lies against panel 82, and with the second tube 96 out of square, the hinge 74/82 is folded 90° and the second tube is inserted into the first tube 94. As the panel 82 becomes upright, the second tube opens out into its rectangular configuration to hold the first tube 94 erect. The panel 78 of the first tube 94 abuts the underside of the lower base flap 16 to support the flap. Again the panels may be reinforced with plywood panels, as necessary, and in particular the panel 82 may be reinforced with a plywood panel which is wider than the panel 82, so as to abut the upright edges of panels 72 and 76 to prevent the panel 82 being pushed past its upright position into the first tube 94.

75 The pallets or palletised containers described above may be modified so that the supports 18 rather than the inserts are mounted on the strips 56 and so that the insert rather than the support 18 are provided on the base of the pallet or container. Also, 80 the combination support and insert shown in Figures 10 and 11 may be modified by separating the panel 82 from the panel 74 and attaching the panel 82 to the base of the pallet or container in position where the insert 85 can be hinged about hinge line 82/84 and inserted into the support.

90 Referring to Figures 13 and 15 of the drawings, the corrugated board blanks 10, 12 shown therein are made up to form two main parts 14, 16 of the case shown in Figures 14 and 16 according to the second invention. In Figures 13 and 15, the continuous lines denote cutting lines, the dotted lines denote fold lines, and the chain lines denote the locations 95 of other parts of the case.

100 Referring specifically to Figures 13 and 15, the part 14 of the case comprises a base formed by panels 18 to 24, an upright rear wall 26, a pair of upright major side wall portions 28, and a top portion formed by panels 30, 32. Three collapsible rectangular section tubes 34 are provided under each of the front and rear edges of the base. As seen more clearly in Figure 5, each set of three 105 tubes is formed by a single piece of board which provides a pair of upright walls 36 and base 38 for each tube, panels 40 extending between the tubes, and stitching 42 flaps which are sandwiched, in the case of the front set of tubes, between lower base panel 18 and upper base panels 24, and, in the case of the rear set of tubes, between lower base panel 18 and upper base panels 22. Once all 110 of the panels and walls have folded into position, the overlapping parts are secured together by stitching or glue.

115 Referring now to Figures 14 and 16, the part 16 of the case comprises a front wall 44, minor side wall portions 46, and a top formed 120 by panels 48, 50. A strip 52 of plywood is

attached to the free edge of each side wall portion 46. When the two parts 14, 16 are assembled the free edges of the side wall portions 28, 46 abut, and the plywood strips 56 overlap the abutting edges. The front wall 44 of the part 16 is reinforced with three upright strips 56 of plywood. The spacing apart of the plywood strips is equal to the spacing apart of the tubes 34, and the strips 56 extend downwardly below the lower edge of the front wall 44 to form tongues 58 for a purpose described below.

In order to hold the tubes 34 erect, insert elements are fitted into the tubes. The insert elements for each pair of tubes below the front and rear walls of the case are connected by a strip 60 of plywood.

Referring specifically to Figure 18, there is shown a simple form of insert element 62 for 20 the front tubes. The insert element is a rectangular section tube of corrugated board open at top and bottom. The front wall 64 of the insert element is connected at its lower edge to the front end of the plywood strip 60 by a metal bracket which permits the connection to flex. Alternatively, the insert 62 may be formed from a blank having a further panel which extends from the lower edge of the front wall 64 and is secured flat against the 30 plywood strip. The insert 62 is inserted into the respective front tube 34 in the direction of arrow 66 in Figure 6, so that the base 38 of the tube is sandwiched between the insert 62 and the strip 60. The plywood strip extends 35 beneath the case and is secured to the respective rear tube 34 for example by an insert of the type described above with reference to Figures 5 to 9.

When the insert 64 has been fully inserted 40 into the tube 34, the front wall 64 extends downwardly from the front edge 68 of the base 24/40 of the case and a slot 70 is formed between that front edge and the upper edge of the front wall 64 of the insert. The 45 three slots 70 so formed serve as locations for the three tongues 58 on the front wall 44.

Once the part 14 of the case has been packed, the part 16 is offered up to the part 14 and the tongues 58 are inserted completely 50 into the slots 70. The side edges 54 abut, and the top panel 50 overlaps the projecting parts of top panels 32. The two main parts are then secured together, for example by sticky tape or banding.

55 A modified insert element is shown in Figure 20 and the corrugated board blank therefor is shown in Figure 19. The insert element comprises a rectangular section tube 72 formed by four panels 74 to 80 and a stitching flap 82. The tube 72 is hingedly connected to a U-shaped portion 84 having three walls 86 to 90 which are secured by integral panels 92 to 96 to the end of the plywood strip 60. In order to attach the plywood strip 60 to the respective front tube 34, the strip is 65

offered up so that the front tube is positioned within the three walls 86 to 90, and the tube 72 is then swung round about hinge line 74/86 and into the tube 34. When fully

70 inserted, wall 78 is flat against wall 88, and the walls 36 of the tube 34 are sandwiched between walls 80 and 86, and walls 76 and 90, respectively. The respective tongue 58 of the front wall may be inserted slotted in 75 between the walls 78 and 88, or preferably be inserted in the slot formed between the front edge 68 of the base and the upper edge of wall 78. In this latter case, the insert is positively locked in position and cannot be 80 removed without removal of the tongue 58.

Referring now to Figures 21 to 25, there is illustrated a modified case according to the second invention. The blank 10 for the part 14 of the case is similar to the embodiment 85 described above with the exceptions that the panel 18 extends only half-way from the rear to the front of the base; the side panels 28 extend completely from the rear to the front of the case and having narrow front wall edge portions 100 formed on the front edges of the side panels 28; and there are no panels 24 or waste portions. A further blank 102 (Figure 22) is used with the blank 10. The further blank 102 provides a front lower base flap 95 104 which, when the case is assembled, lies beneath the inner base flaps 20 abutting the other lower base flap 18, and also provides a front ledge panel 106 which extends between and is stitched to the front wall edge portions 100.

100 The blank 12 for the part 16 of the case provides a front wall 44 which, when fitted to the part 14, overlies the front wall edge portions 100, the lower edge of the front wall 44 abutting the upper edge of the ledge panel 106. The blank 12 also provides the front upper lid flap. The plywood strips 56 are secured to the outer face of the front panel 44. The tongues 58 formed by the lower ends 110 of the plywood strips 56 project further below the lower edge of the front panel 44 than in the embodiment described above, because they extend downwardly over the ledge panel 106 before entering the inserts described

115 above or before entering a modified form of support spacer to be described below. A pair of plywood ears 108 are attached to the edges of the front panel 44 by bendable metal strips 110 for insertion into complementary slots 112 formed in the front wall edge portions 100. If there is sufficient room in the case after packing but before sealing down the front upper lid flap 30, the ears 108 after insertion through the slots 112, can 120 be bent at right angles for added strength.

125 Referring now to Figure 26, there is shown a modified means for attaching supports to the base of the case, as shown in Figure 24. A strip 150 of board is stitched beneath the 130 front edge of the base, the ends 152 of the

strip being folded over and sandwiched between the upper and lower base flaps 104, 20. The strip is kinked to provide three slots 154 along the front edge of the base. The configuration of the strip 150 is like a squat form of the strip shown in Figure 17. A similar strip is attached beneath the rear edge of the base to provide three slots 155.

A palletising support arrangement which is fitted to the slots 154 will now be described with reference to Figures 27 to 30. A collapsible rectangular tube is formed from a blank 156. The tube has four upright walls 158, 160, 182, 164A, 164B. The blank 156 also provides a stitching flap 166 beneath the wall 160. Wall 164 is reinforced with a plywood panel 178 which serves to join the wall portions 164A, 164B, and wall 160 is preferably also reinforced with a plywood panel 180. A further part of the support arrangement is formed from a blank 168, which provides a row of four panels. The stitching flap 166 is folded outwardly and is stitched to the panel 172 adjacent its connection with the panel 174. Alternatively, the flap 166 may be stitched to the panel 174 adjacent its connection with the panel 172. The panel 174 is attached to one end of a plywood strip 60 which serves the same purpose as the strip 60 described above. A further arrangement employing the blanks shown in Figures 27 and 28 is attached to the other end of the plywood strip 60 oriented the same way round as the arrangement shown in Figure 29. It will be appreciated that the structure as shown in Figure 29 is collapsible so that it can be transported and stored in the flat.

To fit the support arrangement to the case, firstly the panels 176 are tucked inside the respective tubes to lie flat against the panels 178 and the tubes are positioned upright on the plywood strip 60. Panel 170 of the arrangement shown in Figure 29 is then inserted from the rear into one of the rear slots 155. At the same time, the panel 170 of the arrangement at the other end of the plywood strip 60 is inserted from the rear into a corresponding one of the front slots 154. Similar support arrangements are fitted to the other two pairs of front and rear slots 154, 155.

The support arrangement as fitted is illustrated in Figure 30, which is a partial sectional side elevation through associated front and rear supports not showing any background detail. It will be noted that a slot 182 is formed between the upper edge of the composite panel 164, 178 of the front support and the lower front edge of the base of the case. It is into the three slots 182 so formed that the tongues 58 extending downwardly from the front panel 44 are inserted to locate the front panel after packing the case.

If additional support is required, a further support unit may be fitted at the centre of

each plywood strip 60, and a strip of board half the width of each strip 150 may be secured to the free edge of each lower base flap 18, 104.

70 Alternatively, a full width strip of board may be secured to the free edge of one of the lower base flaps 18, 104 and project from that edge so as to overlap the free edge of the other lower base flap 104, 18. This has the advantage of covering the line where the two lower base flaps abut.

There now follows a description of a modification to the packaging case disclosed above, reference being made to Figures 31 and 32 of the accompanying drawings which correspond to Figures 24 and 25 described above.

Rather than provide three plywood strips 58 on the removable side 44, in accordance with the modification a single strip 20D of corrugated board or other material is stitched along inner lower edge of the removable side 44 so that the strip 200 projects downwardly from the side 44. The length of the strip 200 is equal to the distance between the front wall edge portions 100. When the removable side is fitted to the container, the projecting part of the strip engages the inwardly facing side of the ledge panel 106. The engagement, together with the right angle fold between the side 44 and the top portion 30, increases the resistance of the side 44 to bowing. As described above with reference to Figures 24 and 25, the ears 108 are inserted into the slots 112, and a further similar pair of ears 202 and slots 204 may be provided.

The container may be provided with support assemblies as described below with reference to Figures 33 to 39, 40 to 43, 44 and 45, or 46 and 47.

105 Referring to Figures 33 to 39, and particularly Figures 37 and 38, a container, according to the third invention, of corrugated board material has four upright walls 10 to 16, lower base flaps 18, 20 hinged to walls 10,

110 14 upper base flaps 22, 24 hinged to walls 12, 16 and top flaps, all of known construction. Three tunnels 26, 28, 30 are formed beneath each lower base flap adjacent its hinge with the respective side wall by a strip

115 32 of board. The strip 32 has ends 34, which are folded over the edges of the lower base flap and stitched thereto. Intermediate the tunnels, the strip has portions 36 which are stitched to the lower base flap. Each tunnel

120 has a lower wall 38 and a pair of short side walls 40, the top of each tunnel being formed by the underside of the lower base flap.

Each pair of tunnels 26A, B; 28A, B; 30A, B provided for securing a respective support assembly to the container. A support assembly will now be described.

125 Referring to Figures 33 to 35 a corrugated board blank 42 provides three panels 44 to 48 and two half panels 50A, 50B. The blank 130 is folded and the half panels 50A, 50B are

connected by a reinforcing panel 52 of plywood to form a collapsible rectangular section tube 53. The panel 46 is also reinforced with a plywood panel 54. A blank 56 provides two panels 58, 60 and a half panel 62. The half panel is secured inside the tube to the plywood panel 54 so that the panel 58 can extend across the lower end of the tube 58 and the panel 60 can be tucked inside the tube to lie against the plywood panel 52 and hold the tube 53 in its rectangular configuration.

Referring to Figure 36, each support assembly further comprises a frame 64 of hinged strips of plywood or other suitable material. The frame comprises a base strip 66 hinged at either end to tie strips 68. The tie strips 68 are in turn hinged to a short tongue 70 and a long tongue 72 respectively. The hinging may be by means of bendable metal plates if the strips are of plywood or a single strip of material may provide all of the strips and tongues if it can be scored and folded without breaking.

Three of the tube 53 assemblies are secured to the upper surface of the base strip 66 at the spaced apart locations shown by shading in Figure 36. Each tube assembly is so secured by stitching of the panel 58 to the base strip 66 with the tube assemblies oriented as shown in Figure 39.

Referring now more particularly to Figure 39, each support assembly is connected to the container as follows. Firstly, each panel 60 is tucked inside its respective tube as aforesaid to hold the tube square. The long tongue 72 is then inserted from the rear into tunnel 26B (28B or 30B) and fed through so that it enters the associated front tunnel 26A (28A or 30A). The frame is then hinged so that the base strip 66 extends beneath the case and the tubes 53 abut the underside of the case. The short tongue 70 and its associated tie strip 68 are then hinged and the short tongue 70 is eased from the front into the front tunnel 26A (28A or 30A) to lie between the end of the long tongue 72 and the lower wall 38 to the tunnel. The front strip portions 36 may be stitched to the lower base flap 50 only over the rearward half of the portions in order to facilitate entry of the short tongue into the tunnel.

It will be noted that the case and supported assemblies may be transported and stored "in the flat" prior to assembly of the palletised container. When assembled and loaded, the weight of the load over the front tunnels squeezes together the short tongue and the end of the long tongue and thus reduces the risk of the tongues being accidentally dislodged.

The invention described above with reference to Figures 33 to 39 may be applied to a pallet rather than to a container. The pallet deck may be formed of corrugated board and

the tunnel forming strips 32 may be made of plywood. These plywood strips will extend at right angles to the long plywood tongues 72 to reinforce the board pallet deck in both directions.

In a modification, the strips 32 may extend over the same width as the lower base flaps so that the long tongue 72 is substantially totally enclosed. In this case, the short tongue 70 and end of the long tongue 72 may abut within the tunnel, rather than overlap.

If the support assemblies are not required to be storable "in the flat", then the panels 60 may be stitched to the panels 50, 52 for added rigidity.

A modified support assembly will now be described with reference to Figures 40 to 43. Each modified assembly comprises three spacers 300 in the form of an open topped box having four upright walls 302 to 308 and a base 310. Each spacer 300 is formed from a blank 312 as shown in Figure 10. The walls 304, 308 of the spacer are formed from half width panels A, B, C which in the completed spacer are stitched to a reinforcing panel 314 of plywood. Two of the spacers 300 are stitched by their bases 310 to the ends of a plywood base strip 316 and the third spacer is stitched by its base 310 to the middle of a further strip 318 of plywood slightly shorter than the base strip 316. The support assembly further comprises a locator element 320 formed by a row of three corrugated board panels 322 to 326, the middle panel 324 of which is stitched to the middle of the base strip 316. A pair of tie panels 328 are hinged to the ends of the base strip 316, and a pair of short tongues 330, 331 are hinged to the upper ends of the tie panels 328.

The modified support assembly is used with a container having attachment tunnels such as tunnel 26 to 30 or 154 and 155 shown in Figures 37. In order to attach the support assembly to, for example, the container 16

shown in Figure 37, firstly one end 332 of the strip 318 is inserted rearwardly into the rear tunnel 26B sufficiently far so that the other end 334 of the strip 318 clears the front tunnel 26A. The strip is then moved in the opposite direction and the end 334 is inserted into the front tunnel 26A so that both ends 332, 334 extend into the respective tunnels. The rear tongue 330 is then inserted forwardly into the rear tunnel 26B so that the tongue 330 and the end 332 of the strip 318 overlap. The base strip 316 is then moved

towards the base of the case and the panels 322, 326 of the locator member are guided into the middle spacer 300 on the strip 318 to lie against the reinforcing panels 314. The other tongue 331 is then inserted rearwardly into the front tunnel 26A so that the tongue 331 and the end 334 of the strip overlap.

In order to facilitate insertion of the tongues

130 330, 331 into the tunnels 26A, 26B, the

tongues may be formed from strip material which is more flexible than plywood. Furthermore, if a material is used which can be bent sharply, the tongues 330, 331, the panels 5 328 and the base strip 316 may be formed from a single strip of material. Preferably, the tongues 330, 331 are fitted into the tunnels 26A, 26B so that they lie over the ends 332, 334 of the strip 318.

10 The assembly may be modified by stitching the centre spacer 300 to the base strip 316 and stitching the locator element 320 to the centre of the strip 318.

A second modification will now be described with reference to Figures 44 and 45. 15 The modified arrangement uses, for each support assembly a base strip 316, a further strip 318, three support spacers 300 and three locator elements 320 like those described 20 above with reference to Figures 40 to 43. The three locator elements 320 are stitched by the middle panels 324 to the further strip 318, and one of support spacers 300 is stitched by its base 310 to the base strip 316. The other 25 two support spacers 300 are not, however, secured directly to the base strip 316.

The arrangement further comprises a pair of plywood tie members 400 which are about twice as long as the height of the support 30 spacers 300. Each tie member 400 is hinged at its lower end by a thin metal plate 402 to a respective end of the base strip 316. The front and rear support spacers 300 are each secured by one of their plywood-reinforced 35 side panels to the lower half of a respective tie member 400. A plywood tongue 404 is hinged by a metal W-hinge 406 to the upper end of each tie member 400. For each support assembly, opposed sides 10, 14 of the 40 container are formed with slots 408 of a size and location to receive the tongues 404.

The support assembly may be attached to the container as follows. Firstly, with the base strip 316 horizontal and the tie members 400 45 vertical, the hingeable panels 322, 326 of the locator elements 320 are fitted into the respective support spacers 300 so that the further strip 318 rests on the tops of the support spacers 300. One of the tongues 404 is bent at right angles to its associated tie member 400 and inserted into the respective slot in the container side. Once fully inserted, the tongue is hinged a further right angle so that the tongue lies against the inner surface 50 of the container side. The tongue 404 is dimensioned and the slot located such that the tip of the tongue 404 can be forced into a gap 410 between the upper base flap 22 and the container side 10, 14. With the further 55 strip 318 flat against the underside of the deck of the container, the base strip 316 is slightly eased away from the deck and the other tie member 400 is pulled away from the side of the container sufficiently for the associated tongue 404 to be hinged at right angles

and inserted into the respective slot. It will be noted that this pulling away of the tie member from the side of the container is accompanied by tilting of the respective support spacer 300 70 and hinging of one of the panels of the locator element 320 inserted into that support spacer. Once the tongue 404 has been fully inserted into the slot 408, it is bent downwardly at right angles and inserted into the gap. The tie members 400 and slots 408 are arranged so that the further strip 318 is firmly sandwiched between the support spacers 300 and the deck of the container.

The slots 408 are preferably reinforced, for 80 example by attaching strips of strong adhesive tape to the inner surfaces of the container side at the slot regions so that when the slots are formed, the container sides are reinforced by the tape around the slots. Alternatively, each 85 slot may be fitted with an elongate plastics grummet.

A third modified support assembly will now be described with reference to Figures 46 and 47. The support assembly comprises a plywood base strip 316 and, secured to the ends thereof by metal hinges 501, a pair of upright plywood panels 500. Three support tubes 502, 504, 506 are used, formed from board blanks as shown in Figure 33. The panel 46 90 of the one of the outer tubes 502 is stitched to one of the upright panels 500; the half panels 50A, 50B are connected by a reinforcing panel 508 of plywood, and one of the other two panels 44, 48 is reinforced with a plywood panel 510. The other outer support tube 506 is similarly constructed. The centre support tube 504 has reinforcing panels 514, 516 stitched to the half panels 50A, 50B and to the panel 46, respectively, and the composite panel 44/516 is attached to the base strip 316 by a metal hinge 518. The support assembly further comprises a further plywood strip 318 which extends across the tops of the support tubes 502 to 506 and is attached to 100 the composite panels 50A/50B/508 of the outer tubes 502, 506 and to the composite panel 50A/50B/514 of the centre tube 504 by metal hinges 520. Lastly, the support assembly comprises a pair of tongues 522 which are hinged to the tops of the upright panels 500 by metal hinges 524.

The container is formed, for each support assembly, with a pair of slots 526 to receive the tongues 522. The slots 526 are formed in 110 the lower base flaps 18, 20 of the container immediately by the folds with the front and rear walls 10, 14 of the container.

In order to attach the support assembly to the container, the tongues 522 are inserted 120 into the slots 526 and through the gaps between the upper base flap 22 and the walls 10, 14 of the container. The tongues 522 are then hinged downwardly to lie flat over the upper base flap 22 of the container. When 130 the container is loaded, the load will assist in

keeping the tongues 522 flat against the deck of the container.

Box-like supports as shown in Figure 41 may be used instead of the support tube 502, 504, 506 described above. Also, the metal hinges 524 may be replaced by T-section extended plastics hinges, the cross-bar of the T being secured to the upright panel 500 and the tongue 522, and the upright of the T 10 being secured to the further strip 318. The support arrangement may be modified by using a shorter further strip 318 which extends only as far as the inner walls 50A/50B/508 of the outer support tubes 502, 506 or boxes 15 and is connected to the inner walls by the brackets 520.

Rather than using two or three spacer members 53, 300, 502, etc. in each support assembly, a single spacer structure may be 20 used, having the form of an elongate, corrugated board box or tube extending the width or length of the container or pallet. In that case, the pallet or container will be of the two-way entry type, i.e. the forks of a fork lift 25 truck may be inserted beneath the deck from only two directions, rather than four. Such a support structure may be reinforced by plywood panels, as necessary.

### 30 CLAIMS

1. A pallet or palletised container comprising a deck for supporting a load, a plurality of collapsible supports provided beneath the deck, each support comprising a base wall 35 and a pair of parallel side walls each side wall having a lower edge hinged to the base wall and an upper edge hinged beneath the deck, and at least one insert for each support adapted to be inserted therein to hold the 40 support erect with the side walls upright, the pallet or container comprising at least one flat base member adapted to extend between and lie flat against the base walls of at least two of the supports, means for attaching the inserts 45 for those two supports to one of the base member and the deck, of the supports being attached to the other of the base member and the deck, each insert comprising a collapsible rectangular tube of sheet material having four 50 walls hinged one to another, and the attachment means being arranged to permit the tube to be inserted in a collapsed condition into the support and to permit the tube then to be opened out so that two walls of the tube 55 extend across the support.
2. A pallet or palletised container as claimed in Claim 1, wherein the tube is hinged adjacent one of the wall hinges thereof to the base member or the deck.
3. A pallet or palletised container as claimed in Claim 2, wherein the hinging of the tube to the base member or the deck is by means of a panel hinged to the tube and secured flat against the base member or the 65 deck.

4. A pallet or palletised container as claimed in Claim 1, wherein the attachment means is arranged to permit the tube to be inserted in the collapsed condition into the support with wall hinges of the tube parallel to the deck, to permit the tube then to be twisted so that the wall hinges of the tube is at right angles to the deck and to permit the tube then to be opened out so that two walls of the tube extend across the support.
5. A pallet or palletised container as claimed in Claim 4, wherein the attachment means comprises a first panel having a edge hinged to an end edge of one of the walls of the tube, and a second edge at right angles to said first edge hinged to a first edge of a second panel, a second edge of the second panel opposite said first edge thereof being hinged to the base member or the deck.
6. A pallet or palletised container as claimed in Claim 5, wherein the second edge of the second panel is hinged to the base member or the deck by means of being hinged to a third panel secured flat against 90 the base member or the deck.
7. A pallet or palletised container as claimed in Claim 6, wherein the tube and the first, second and third panels are formed from a single blank of sheet material.
8. A pallet or palletised container as claimed in any preceding claim, wherein the supports are attached to the underside of the deck, and the inserts are attached to the base member.
9. A pallet or palletised container as claimed in any of Claims 1 to 7 wherein the supports are attached to the base member and the inserts are attached to the underside of the deck.
10. A pallet or palletised container substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 9 or in Figures 1 to 3 and 10 to 12 of the accompanying drawings.
11. A packaging case of corrugated board adapted to have a particular right way up, wherein a side of the case is removable to permit packing of the case from the side.
12. A packaging case as claimed in Claim 11, including means to locate the removable side in position with respect to the remainder of the case ready for securing the removable side in position.
13. A packaging case as claimed in Claim 12, wherein the case is provided with a plurality of spacers to form an inbuilt pallet to space the base of the case from a support surface and to define the right way up of the case.
14. A packaging case as claimed in Claim 12 and in Claim 13, wherein at least two of the spacers extend to that edge of the base which is below the removable side, the locating means comprising a plurality of tongues 130 extending downwardly from a lower edge of

the removable side and engageable downwardly into respective slots formed by said at least two spacers.

15. A packaging case as claimed in Claim 5 14, wherein each tongue is provided by a lower end of an elongate strip of stiff material secured to the removable side to reinforce the removable side.

16. A packaging case as claimed in Claim 10 14 or 15 wherein each of said at least two spacers comprises a hollow structure one upright wall of which extends downwardly from that edge of the base which is below the removable side, a slot being formed between 15 the upper edge of the upright wall and that edge of the base to receive the respective tongue.

17. A packaging case as claimed in Claim 16 wherein each of said at least two spacers 20 comprises a rectangular section collapsible tube having an open end extending to that edge of the base which is below the removable side and facing outwardly in the same direction as the removable side, and an insert element at least a portion of which is inserted into the tube to hold the tube erect, said one upright wall of the spacer being formed by an upright wall of the insert element.

18. A packaging case as claimed in Claim 30 17, wherein the insert element is inserted in the tube from the other end of the tube, stop means being provided to prevent insert element sliding out of the tube through said one end thereof, and insertion of the respective tongue into the slot preventing the insert element sliding out of the tube through said other end thereof.

19. A packaging case as claimed in Claim 40 16, wherein each spacer of said at least two spacers comprises a rectangular section collapsible tube open at the top thereof and means to attach the tube to the underside of base so that one wall of the tube is below that edge of the base which is below the removable side with the slot being formed between said one wall of the tube and said edge of the base.

20. A packaging case as claimed in Claim 50 19 wherein the attachment means comprises tongue provided on the spacer, which tongue is insertable into slot provided beneath the base of the case.

21. A packaging case substantially as hereinbefore described with reference to and as 55 illustrated in Figures 13 to 20 or Figures 21 to 30 or those figures as modified by Figures 31 and 32 of the accompanying drawings.

22. A pallet or palletised container, comprising a deck and at least two support assemblies for supporting the deck spaced from a support surface, each support assembly comprising a base member extending widthways or lengthways beneath the deck and having a lower surface to rest on the support surface 60 and an upper surface, at least one spacer 65 member extending between the base member and the underside of the deck to support the deck, means securing each spacer member to the base member or the deck, a tie member secured to each end of the base member and extending upwardly therefrom to the deck and means to secure each tie member to the pallet or container.

23. A pallet or palletised container as 70 claimed in Claim 22, wherein two such spacer members are provided in each support assembly.

24. A pallet or container as claimed in Claim 23, wherein each spacer member comprises a collapsible rectangular section tube 75 having its axis vertically oriented.

25. A pallet or container as claimed in Claim 24, wherein the means for securing the tube to the base member of the deck comprises an attachment element hinged to one wall of the tube and secured to the base member and the deck.

26. A pallet or container as claimed in Claim 25, wherein the attachment element 80 comprises a strip of board, the strip having a free end panel adapted to be folded to engage an inner wall of the tube opposite the wall to which the strip is hinged in order to hold the collapsible tube in its rectangular configuration.

27. A pallet or container as claimed in Claim 22 or 23, wherein each spacer member 85 comprises a rigid structure having four upright walls.

28. A pallet or container as claimed in any of Claims 22 to 28, wherein for each support assembly, the deck is formed with a tunnel or tunnels extending across the deck in the same direction as the respective base member, the 90 means for securing each tie member to the pallet or container comprising a tongue hinged to the upper end of the tie member and arranged for insertion into the respective tunnel.

29. A pallet or container as claimed in Claim 28, wherein a pair of tunnels are provided for each support assembly, each support assembly further comprising a further member extending between the tunnels and 95 attached to the deck thereby, three such spacer members being provided in each support assembly, one of which spacer members is attached to one of the base member and the further member, said one spacer member engaging a locating means provided on the other of the base member and the further member.

30. A pallet or container as claimed in any one of Claims 22 to 27, wherein the container 100 is formed with slots above the ends of the base member, and the tie members extend upwardly to the respective slots, the means for securing each tie member to the container comprising a tongue hinged to the upper end 105 of the tie member, the tongue being inserted 110 into the slot.

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into the respective slot and hinged so as to lock the tie member to the container.

31. A pallet or container as claimed in Claim 30, wherein the slots are provided in the deck of the pallet or container, the tongues being hinged so as to overlie the deck.

32. A container as claimed in Claim 31 having upper and lower base flaps, the slots being formed in the lower base flaps adjacent the walls of the container to which those flaps are connected, and each tongue being inserted through the slot and passing through a gap between the respective upper base flap of the container and the respective container wall.

33. A container as claimed in Claim 30 wherein the slots are formed in the walls of the container each tongue being hinged so that the container wall beneath the slot is sandwiched between the tongue and the tie member.

34. A pallet or container as claimed in any preceding claim and substantially as hereinbefore described with reference to and as illustrated in Figures 40 to 47 of the accompanying drawings.

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